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- 5        Drive train with a selection device for the  
      selection of driving mode ranges of an automated  
      manual transmission or of an automatic transmission  
          for a motor vehicle

10       The invention relates to a drive train with a selection  
device for the selection of driving mode ranges of an  
automated manual transmission or of an automatic  
transmission for a motor vehicle according to the  
preamble of patent claim 1.

15       Known selection devices for presetting a driving mode  
range PRND are conventionally designed as selector  
levers in the region of the vehicle tunnel, cf., for  
example, DE 40 05 588 A1.

20       Alternatively, a selection device is designed as a  
steering column gearshift, cf., for example, EP 1 045  
172 A2, US 6,076,414, EP 0 132 256 B1, DE 43 05 903 A1,  
EP 0 432 507 B1 and DE 198 28 039 A1.

25       The invention is based on the recognition that both the  
selector lever arranged in the region of the vehicle  
tunnel and the steering column gearshift occupy, in the  
passenger cell, an inner space which is to be saved for  
esthetic reasons, for simplification and/or for the  
30       arrangement of other components in this region.

      Furthermore, the invention is based on the recognition  
that the operation of the selector lever and of the  
steering column gearshift, both during the starting of  
35       the motor vehicle and when the latter is in operation,  
requires additional distances to be covered by the  
driver's hands which normally rest on the steering  
wheel. Moreover, the selector lever and the steering

column gearshift project into the interior of the passenger cell, with the result that unwanted faulty operations are possible.

5 According to the invention, therefore, it is proposed that the selection device be arranged on the steering wheel itself, in particular as an integral part of the latter. As a result, construction space is saved and the abovementioned faulty operation is avoided. An  
10 actuation of the selection device takes place by means of a rotational movement about a steering wheel rim of the steering wheel. Such a degree of freedom of movement can be implemented in a simple, but space-saving way by mounting with respect to the  
15 steering wheel rim. Moreover, the driver can easily operate a selection device of this type. Furthermore, the driver does not have to remove his hands from the steering wheel in order to actuate the selection device.

20 The invention, then, is explained by means of an exemplary embodiment, with reference to the drawing.

The single figure shows diagrammatically part of a  
25 steering wheel of a motor vehicle with a selection device according to the invention arranged in the steering wheel rim.

The figure shows a steering wheel 1 consisting of one  
30 or more steering wheel spokes 2 and of a steering wheel rim 3 having a (circumferential) axis 10. The steering wheel rim 3 has arranged on it a selection device 4 according to the invention for the selection of various gears, shift programs or driving mode ranges for an  
35 automated manual transmission or an automatic transmission. The selection device 4 is connected to following actuators in the transmission by means of electrical connecting lines which run in the steering

wheel 1 in a known way. Instead of the electrical connecting lines, radio signals may also be used.

Preferably, the selection device 4 is designed as a  
5 ring rotatable about the (circumferential) axis 10 or  
displaceable along the (circumferential) axis 10 or as  
a combination thereof and has a marking, a notch or a  
nose 7 which, in the case of a specific gear, shift  
program or driving mode range, points to a  
10 corresponding symbol 8a, 8b, 8c printed onto the  
steering rim 3 or embossed into the steering wheel rim  
3 or causes such a symbol 8a, 8b, 8c to become visible.

In particular, when a steering wheel 1 is not subjected  
15 to any steering lock, for example in the case of  
uniform motorway travel, the selection device 4 is in  
the 6 o'clock position or in the 10 o'clock or 2  
o'clock position. Preferably, the selection device 4  
can be displaced along the steering wheel rim 3 into a  
20 position favorable for the specific driver's grip, so  
that it can be operated, for example, with the right or  
left hand. However, this displacement of the selection  
device 4 into a position for a favorable grip is to be  
possible only with somewhat greater effort or only  
25 after the release of a lock, since there is otherwise  
the risk that the selection device 4 is displaced  
unintentionally, for example during the shift of a  
gear, shift program or driving mode range.

30 Preferably, the contour or cross section of the  
selection device 4 in the neutral or middle position  
corresponds largely to the contour or cross section of  
the adjacent steering wheel rim 3 and deviates from  
this in another position, so that the driver detects  
35 whether the neutral or middle position is set.

To select a specific gear, shift program or driving  
mode range, the selection device 4 is pivoted

rotationally about the steering wheel rim 3 according to a turn 5 or is displaced along the steering wheel rim 3 in the direction 6, or both in combination. As illustrated, the selection device 4 may in this case have as a plurality of stable positions, for example in each case a position for the driving mode ranges "P" (park), "R" (reverse), "N" (neutral), "D" (drive), if appropriate also "1" (only first gear), "2" (only first and second gear), etc. within the driving mode range "D", be designed with two unstable outer or shift positions and one stable middle position, or, again, both in combination.

A first exemplary embodiment is obtained when said driving mode ranges are set by the selection device 4 being pivoted rotationally about the steering wheel rim 3 according to the turn 5, and the optional manual sequential shifting of the gears takes place by means of the displacement of the selection device 4 along the steering wheel rim 3 in the direction 6, pivoting taking place rotationally into a plurality of fixed switch positions, and the selection device 4 being designed as a pushbutton for optional upshifting and downshifting.

In a second exemplary embodiment, said driving mode ranges are set by means of the displacement of the selection device 4 along the steering wheel rim 3 in the direction 6 and the optional manual sequential shifting of the gears is carried out by the selection device 4 being pivoted rotationally about the steering wheel rim 3 according to the turn 5, the selection device 4 being designed again as a push button for optional upshifting and downshifting rotationally in the direction of the turn 5, and each driving mode range corresponding to a fixed switch position in the direction 6.

Alternatively to the switch or push button movable in the two actuation directions according to the turn 5 and in the direction 6, the selection device 4 may also be designed as a two-part or three-part ring, a first  
5 part of the ring making it possible, for example, to select a shift program, for example summer, winter or sports operation, a second part making it possible to select one of the driving mode ranges already mentioned, and the third part allowing optional  
10 upshifting or downshifting in manual mode, or as a combination thereof.

Or the selection device 4 serves merely for selecting the desired driving mode range, and the desired shift  
15 program or a gear is set, for example, by means of shift rockers or pressure switches 9 which are arranged, preferably for a favorable grip, in the transition between a steering wheel spoke 2 and the steering wheel rim 3.

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Furthermore, the selection of gears, shift programs or driving mode ranges may take place by means of a combination of the selection device 4 described on the steering wheel 1 and further shift or selection buttons  
25 on the steering wheel 1, or in combination with a conventional selector lever.

A contribution to increased safety is made when the selection device 4 can be shifted out of a parking  
30 position P or a neutral position N into a driving mode range D or R only when the motor vehicle is at rest, and, conversely, another position of the selection device 4 out of the driving mode range D or R can be selected only when the motor vehicle is (again) at a  
35 standstill.

The extent of the selection device 4 in the circumferential direction corresponds, in particular, to at least the width of a driver's hand.